



OCONEE COUNTY COUNCIL

SPECIAL MEETING

5:00 P.M., Tuesday, November 19, 2019

Council Chambers

Oconee County Administrative Offices

415 South Pine Street, Walhalla, South Carolina 29691

Call to Order

Presentation to Council

- Alternative Waste Processing Methods / Ms. Brock, County Administrator

Adjourn

[This agenda is not inclusive of all issues which Council may bring up for discussion at this meeting.]

*The public is invited to attend the meeting, however, an opportunity for public comment **will not** be offered at this meeting.*

Oconee County Council & Committee meeting schedules and agendas are posted at the Oconee County Administration Building and are available on the County Council Website www.oconeesc.com/council.html
[All upcoming meetings will be held in Council Chambers unless otherwise noted]

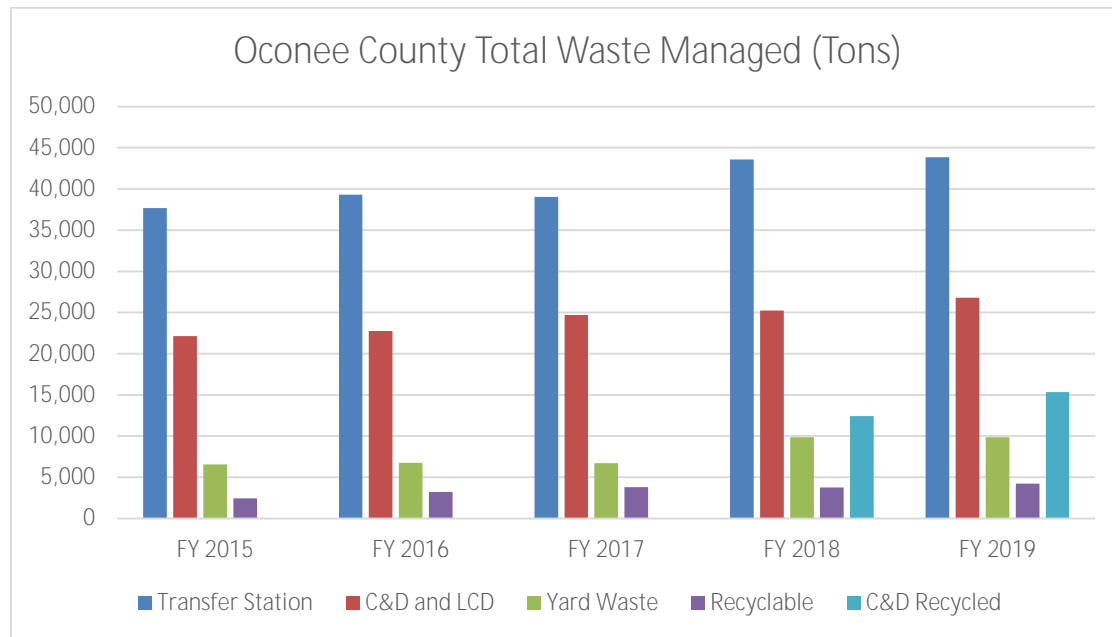
Council's meetings shall be conducted pursuant to the South Carolina Freedom of Information Act, Council's Rules and the Model Rules of Parliamentary Procedure for South Carolina Counties, latest edition. This agenda may not be inclusive of all issues which Council may bring up for discussion at this meeting. Items are listed on Council's agenda to give public notice of the subjects and issues to be discussed, acted upon, received as information and/or disposed of during the meeting. Items listed on Council's agenda may be taken up, tabled, postponed, reconsidered, removed or otherwise disposed of as provided for under Council's Rules, and Model Rules of Parliamentary Procedure for South Carolina Counties, latest edition, if not specified under Council's rules.



SOLID WASTE DISPOSAL EVALUATION
OCONEE COUNTY, SOUTH CAROLINA
NOVEMBER 19, 2019

OVERVIEW

The Oconee County Transfer Station receives approximately 45,000 tons of municipal solid waste (MSW) a year. The transfer station has a current permit limit of 300 tons per day and is now seeing days where 250-290 tons are being processed. Violation of the permit will occur once 300 or more tons are processed on any given day. The county's continued growth and the recent closure of the Pendleton Transfer Station led to an increase in the amount of waste processed through the transfer station. Due to these increases, the transfer station will need to expand, a new transfer station constructed, or other types of waste processing methods implemented.

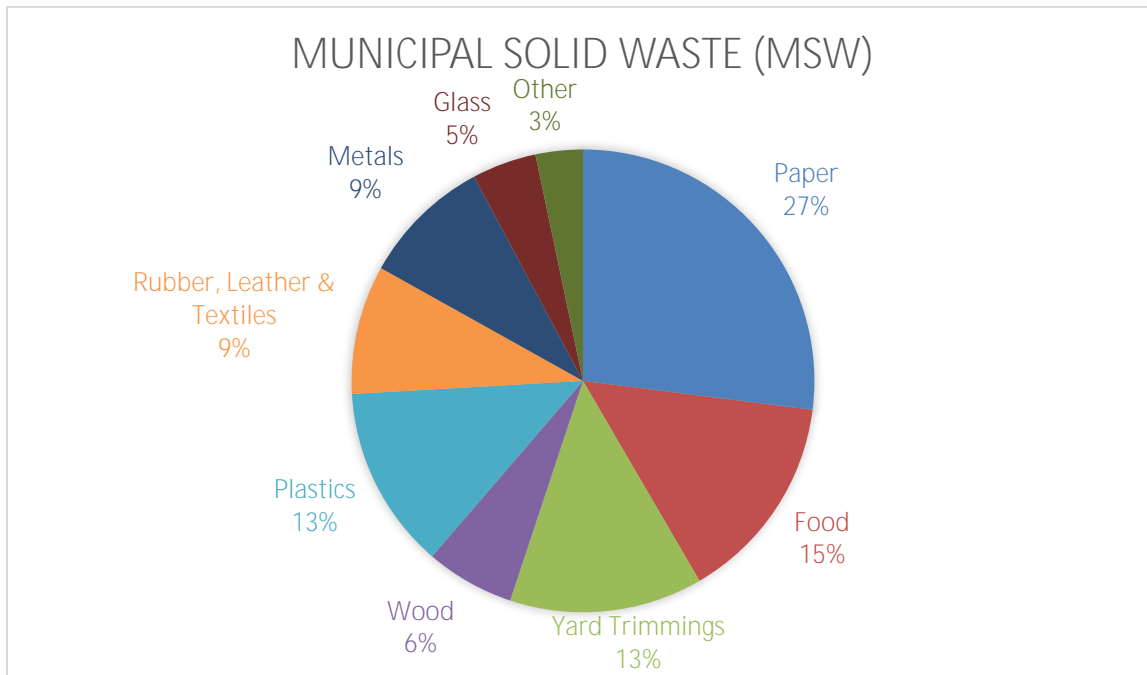


Oconee County currently has a contract with the R&B Waste Management landfill in Homer, GA. The contract began in August 1998 and will be up for renewal in 2023. When the contract began, Oconee County paid \$25.75 per ton. Currently, Oconee County pays a tipping fee (including transportation from Seneca to Homer) of \$34.70 per ton.

Oconee County contacted R&B Waste Management and three other landfills to determine the life expectancy and future of each. All of the landfills have areas to expand after the current cells close. The life expectancies are as follows:

R&B Waste Management Landfill	Homer, GA	25+ Years Life Expectancy
Abbeville County Landfill	Abbeville, SC	40+ Years Life Expectancy
Anderson Regional Landfill	Belton, SC	20+ Years Life Expectancy
Twin Chimneys Landfill	Honea Path, SC	30+ Years Life Expectancy

Consistent with MSW collected across the country, Oconee County's MSW is comprised primarily out of paper, food, yard trimmings and plastics.



In the past, municipalities shipped much of their used paper, plastics and other scrap materials to China for processing. In January 2018, China banned imported foreign garbage as part of a broad antipollution campaign. This, coupled with low market values for recyclable materials, resulted in thousands of tons of recyclable materials going to landfills in the United States.

Concerns regarding future MSW disposal arose. Oconee County staff reviewed potential MSW disposal methods. These methods generally fall into the categories of incineration, conversion and handling. The following techniques were evaluated:

Incineration

- Mass Incineration
- Pyrolysis
- Waste Gasification

Conversion

- In-Vessel Composting

Handling

- Class Three Processing
- Glass Crushing
- Transfer Station

These technologies are in varying stages of development in the United States and around the world. This study evaluates each of the methods including descriptions, available information on pilot studies/full scale use, listing of advantages/disadvantages and approximate construction and operational costs.



- Oconee County saw an increase in Municipal Solid Waste (MSW) managed over the last five years.
- The Oconee County transfer station receives approximately 45,000 tons of MSW annually.
- The transfer station has a permit limit of 300 tons per day.
- The county's growth will lead to an increase in waste processed through the transfer station.
- Oconee County reviewed incineration, conversion and handling methods as alternative means of disposal.



WASTE INCINERATION TECHNOLOGIES

Mass Incineration – the use of controlled flame combustion to thermally break down unsorted municipal waste, producing residue that contains little or no combustible materials.

Pyrolysis – the process whereby organic material is decomposed in a kiln in the absence of oxygen to produce chars, tars, oils or gas.

Gasification – the process whereby organic material is decomposed in a kiln with oxygen to produce combustible synthesis gas, or syngas.



McKay Bay Refuse-to-Energy Facility (Photo Credit: City of Tampa)

WASTE INCINERATION TECHNOLOGIES

The first incinerator in the United States was built in 1885. By the mid-20th century, there were hundreds of incinerators in operation. However, the Clean Air Act (CAA), enacted in 1970, placed restrictions on emissions and banned the uncontrolled burning of MSW. Any facilities that did not meet the requirements of the Act were closed.

In the 1990s, the EPA enacted the Maximum Achievable Control Technology regulations in response to the newly recognized threats from mercury and dioxin emissions. Although the majority of non-hazardous waste incinerators had pollution control equipment, these facilities had to be retrofitted with air pollution control systems or shut down.

Waste incineration methods include mass incineration, pyrolysis and waste gasification. Pyrolysis, gasification and mass incineration are very similar as each involves burning waste at high temperatures to produce gas and solid char. A common element of incineration methods is that they produce some form of ash residue, byproduct, or bypass waste that requires disposal in a lined MSW landfill. The differences between these technologies are the amount of preprocessing, the temperature of the burn process and the amount of oxygen present.

Other incineration methods, such as thermal depolymerization and plasma arc melting, are typically designed for separated single items and/or small scale situations and are not cost effective. Therefore, they were not considered as viable options for this evaluation.

MASS INCINERATION

From **the 1980's through the early 1990's, landfill costs started to skyrocket in parts of the country.** Incineration was thought to be the answer to counties' and states' waste disposal. In some cases, incineration is used solely for disinfection and volume reduction. Waste is reduced to 10-15% of its volume after mass incineration.

The main types of waste subjected to incineration are municipal wastes, non-hazardous wastes, hazardous wastes, sewage sludge and clinical wastes. MSW contains biomass (or biogenic) materials like paper, cardboard, food waste, grass clippings, leaves, wood and leather products; as well as nonbiogenic materials like plastics, metals and petroleum-based synthetic materials. The biogenic component of MSW makes up about 59% of the total tonnage.

Mass burn facilities are categorized as either refractory or water wall. A refractory incinerator traps heat within the combustion chamber by insulated ceramic walls. Water wall incinerators transfer the combustion heat to water which then flows to boilers. Water wall systems **use the water's energy to** create steam which can be sold directly or may be used to turn electric generator turbines to create electricity, which can also be sold.



Municipal Solid Waste Incinerator in Baltimore, MD (Photo Credit: Baltimore Sun)

The South Carolina Solid Waste Policy and Management Act states no solid waste incinerator with a daily capacity in excess of six hundred tons may be permitted within the State. Further, any solid waste incinerator with a daily capacity in excess of one hundred tons may not be permitted to be sited within three miles of another such facility. The Act also regulates the manner of which municipal solid waste incinerator ash is disposed of at a solid waste landfill.

Municipal solid waste-to-energy plants with electricity generation capacity (2015)



Source: U.S. Energy Information Administration, *Monthly Electric Generator Report*

All incineration methods produce ash. Bottom ash is produced as residue from the burn process and must be disposed of in a lined municipal solid waste landfill. Fly ash from baghouse filters can potentially be sold for beneficial reuse.

New technologies to convert municipal waste streams into fuel are rapidly developing. Waste-to-

energy (WTE) technologies are garnering increasing interest and demand due primarily to alternative energy initiatives. WTE power plants convert the combustible content of MSW to energy. WTE plants account for a relatively small portion of the total US electric capacity and generation, approximately 0.4% in 2015.

By the end of 2015, the United States had 71 WTE plants that generated electricity in 20 states. WTE plants are primarily located in areas of the country that either have limited space for landfills or the water table is very close to the **Earth's surface and a landfill is not feasible.**

Mass incineration is a tested and viable technology; however, it has a history of high capital costs, difficult permitting, and significant air pollution control requirements. Even with the sale of electricity, the costs are significant.

All facilities must be adjacent to or have direct access to roads that are of all-weather construction. The active waste handling area must not extend closer than five hundred feet to residences, schools, day-care centers, hospitals or recreational park areas. The site for mass incineration facilities should be at least fifty (50) acres to accommodate size of the equipment and meet South Carolina Department of Health and Environmental Control (SC DHEC) setback requirements.

State and Federal regulations regulate the emissions and air quality control of mass incineration facilities. Ongoing education and public outreach may be required during the planning, construction and operation stages of this facility.

MASS INCINERATION

PROS

- Does Not Require Pre-Processing
- Yields Fly Ash and Electricity
- Only 15% of MSW to Landfill
- Tested and Viable Technology
- Familiar Technology

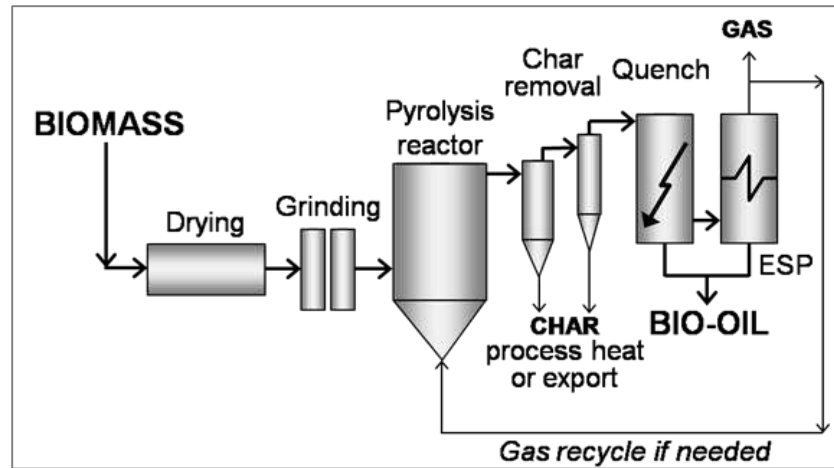
CONS

- High Capital Costs
- Significant Operational Costs
- Difficult Permitting Process
- Significant Air Pollution Control Requirements

Site Considerations: All facilities must be adjacent to or have direct access to roads that are of all-weather construction. The active waste handling area must not extend closer than five hundred feet to residences, schools, day-care centers, hospitals or recreational park areas.

PYROLYSIS

Pyrolysis is the process whereby material is decomposed in a kiln in the absence of oxygen to produce gases, liquids and solids. Because no oxygen is present, the material does not combust, but the chemical compounds thermally decompose into combustible materials. This process typically only involves plastics; therefore, pre-processing is required to remove any glass, metal and aggregate material or contaminants. Additionally, this process requires shredding of the waste stream as well as a drying process to remove moisture. Approximately sixty (60%) percent of the material is consumed by pyrolysis and all other materials would be diverted or landfilled.



Pyrolysis (Photo Credit: Ashton University Birmingham, UK)

After pre-processing, the organic waste stream undergoes pyrolysis which yields solid char, tars, oils and gas. The products from this process are crude and typically require filtration of impurities prior to use. The waste stream determines whether or not the products have a potential beneficial reuse. Some of these products can be sold to refineries for processing into a consumer product.

In 2012, three commercial-scale pyrolysis facilities existed in the U.S. including Agilyx, Intrinergy Coshocton and JBI. Each of these facilities produced a petroleum (crude oil) type product that is, or may be, sold as a chemical commodity rather than used for producing energy. Publicly available information showed that commercial-scale pyrolysis facilities were operating in more of a demonstration mode. These facilities did not have waste or energy contracts and operations were not continuous.

In the U.S, State and local regulatory and permitting processes have proven difficult. In 2016, Sevier County, Tennessee received a grant from the Tennessee Department of Environment and Conservation to pursue a pyrolysis unit to remove glass from a compost product. During the permitting process, the Department of Environment and Conservation denied the permit. As with all incinerator methods, high capital costs and operating costs are a major concern.

PYROLYSIS

PROS

- Yields Solid Char, Tars, Oils and Gas
- Materials Do Not Combust
- Chemical Compounds Thermally Decompose
- Contained in Kiln

CONS

- Typically Only Plastics
- Pre-Processing Required to Remove Inorganic Material
- Drying Process Required to Remove Moisture
- Difficult Permitting Process

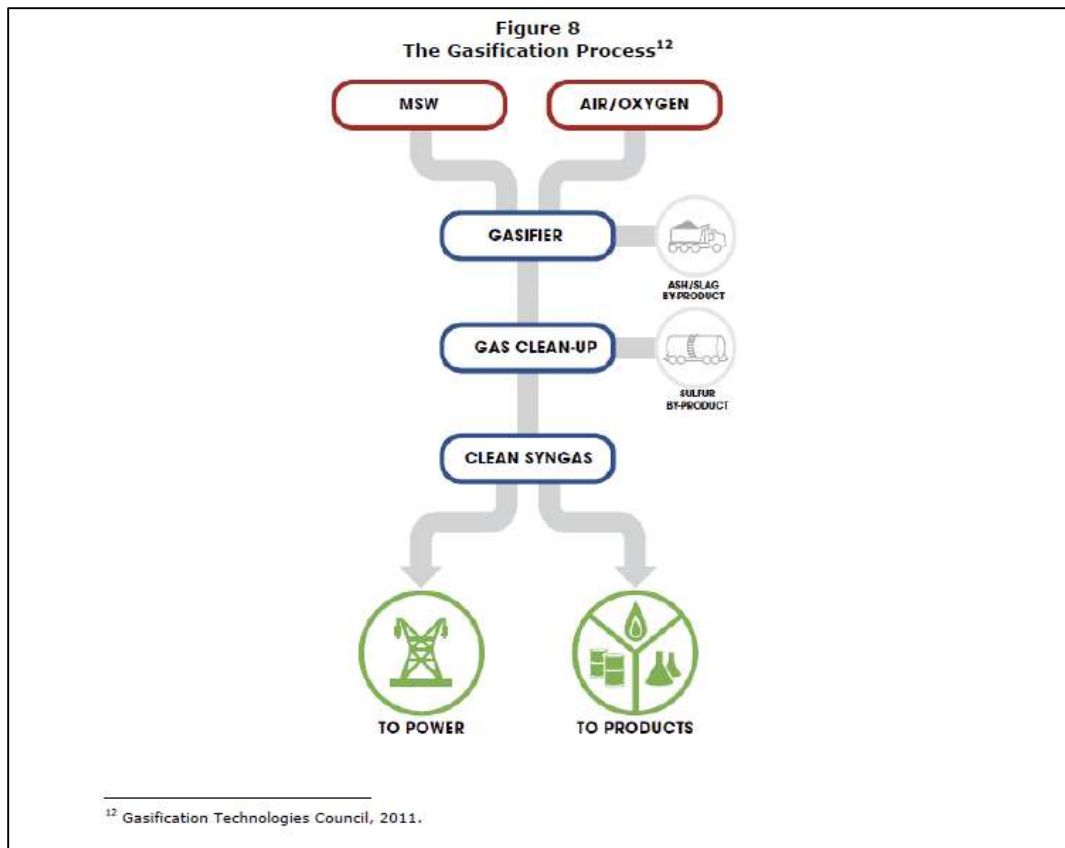
Site Considerations: Litter, noise, odor, traffic and dust must be assessed and will vary according to the facility technology, size and feedstock.

WASTE GASIFICATION

The process of gasification closely resembles that of pyrolysis. The primary difference is that gasification technologies biodegrade fractions of MSW in addition to plastics. Gasification also takes place in the presence of oxygen. The temperature and the presence of oxygen play a major role in determining the final products such as primary tars, tertiary tars, nitrogen rich low heat fuels, fuels free of nitrogen and synthesis gas (syngas). Syngas is a valuable commercial product used as an intermediate to create synthesis natural gas, methane, methanol, dimethyl ether and other chemicals. It can also be used directly to produce energy as a surrogate for natural gas.

As with pyrolysis, the byproducts of gasification include char, tar and gases. Due to the presence of oxygen, combustion occurs which results in the production of ash. The ash must be disposed of in a lined municipal solid waste landfill.

This process requires upfront separation of non-organic materials and to homogenize the material. There are no commercially operating gasification facilities with a waste stream comprised wholly of MSW in the U.S., but there are a number of MSW-based facilities under development and testing.



GASIFICATION

PROS

- Yields Primary Tars, Tertiary Tars, Nitrogen-Rich Low-Heat Fuels, and Syngas
- Minimal Land Requirements
- Little Public Opposition
- Efficient Energy Production

CONS

- Pre-Processing to Remove Non-Organic Materials
- High Costs
- No Commercial Facilities Operating in the US
- Possibility for Hazardous Residues

Site Considerations: Litter, noise, odor, traffic and dust must be assessed and will vary according to the facility technology, size and feedstock.

CONVERSION TECHNOLOGIES

Conversion Technology – a broad range of technologies used to convert solid waste into useful products, chemicals and fuels.

Composting – the process where macro and microorganisms facilitate the biodegradation of organic material.



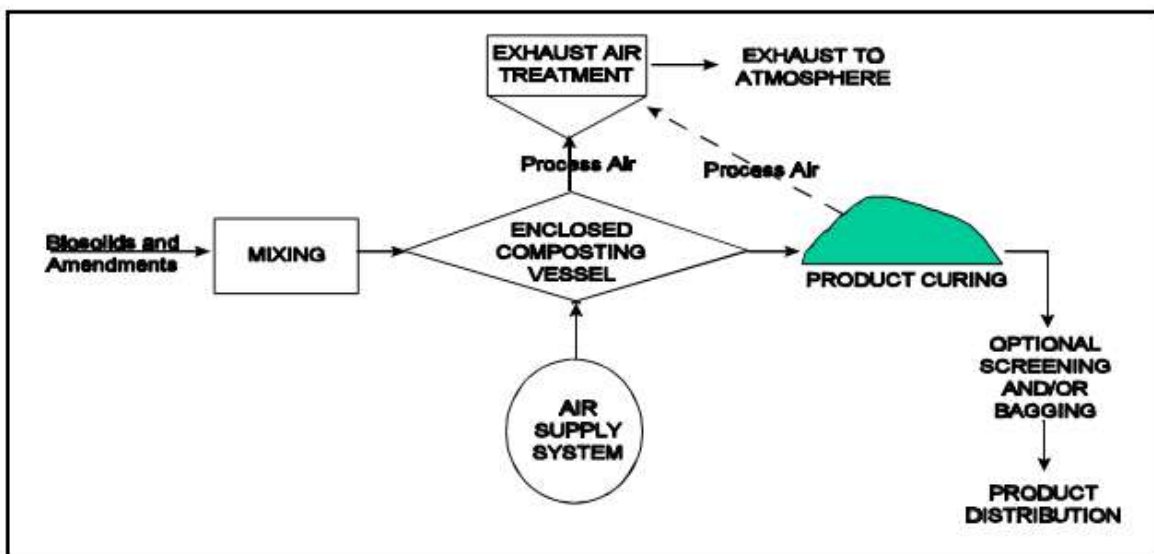
In-Vessel Compost Facility in San Jose, California (Photo Credit: JRMA)

CONVERSION TECHNOLOGIES

IN-VESSEL COMPOSTING

Composting is a process where macro and microorganisms facilitate the biodegradation of organic material. In-vessel composting controls the process by housing the digestion in a metal canister. Heat, organisms, wastewater and air flow may be monitored and electronically controlled.

Composting systems only apply to the organic fraction of waste; therefore, significant pre-processing or separate collection must take place to ensure non-organic waste does not enter the process. Without pre-processing, the final product is littered with particles of unwanted material. Composting requires manual sorting of materials upfront or that specific items are kept out of the waste stream. Once the waste comes out of the digesting vessel, the compost has to cure for 30-45 days depending on ambient temperature.



Source: Modified from U.S. EPA, 1989.

In-vessel composting occurs within a contained vessel, enabling the operator to maintain closer control over the process in comparison with other composting methods. In-vessel composting allows for treatment of air to remove odors for release, making it more suitable in suburban and urban settings. The requirement for a relatively small amount of land also increases its applicability in these settings. Market for use of the resulting product is more readily available in suburban and rural areas.

In-vessel composting facilities can result in environmental impact if mismanaged. In-vessel composting facilities can impact air, water and soil. Primary impact to air is nuisance odors if

process air is not properly treated. Impacts to surface water bodies resulting from in-vessel composting are unlikely.

After waste is fed through digesters and the large in-organics are removed, it sits in windrows for 28 days. The compost is screened to $\pm \frac{1}{4}$ inch, yet there are often remnants of glass or other contaminants. The compost is available to the public to spread on local farms, use for erosion control or topsoil mixtures.

The use of biosolids compost as a soil conditioner results in increased water holding capacity, increased aeration and drainage for clay, provides organic nitrogen phosphorus and potassium, provides essential plant micronutrients, may reduce the need for pesticides.

There are only a handful of these facilities worldwide. The Sevier County, Tennessee facility processes approximately 100,000 tons per year and has been operating since the early 1990's. Prescreening is not allowed, so the compost is severely contaminated with glass, plastic and other small particles even after sifting/screening once the material comes out of the digestion vessel. The material is given to landfills and the Tennessee Department of Transportation for use as soil and slope stabilizer and the remainder of the material is stockpiled on land surrounding the facility. The facility also manages everything indoors due to the odors the material emits during the curing process.



In-Vessel Compost Facility in Sevier County, TN (Photo Credit: Erin L. McCoy – Yes Magazine)

Standard compost can be sold for \$20 per ton, but the Sevier County facility does not prescreen, resulting in contaminated compost which is provided to the Tennessee Department of Transportation and the public for free.

IN-VESSEL COMPOSTING

PROS

- Proven Technology
- Low Energy Consumption Compared to Other Methods
- Viable Product
- Up to 60% Waste Reduction

CONS

- Potential Odor
- Only Processes Organic Feedstock
- Pre-Processing Required to Separate Organics and Recyclables

Site Considerations: In-vessel composting allows for treatment of air to remove odors for release, making it more suitable for suburban and urban settings. The requirements for a relatively small amount of land also increases its applicability for these settings.

HANDLING TECHNOLOGIES

Class Three Processing – the sorting out of viable recyclables from an incoming waste stream, also known as mixed waste processing.

Transfer Station – a building or processing site for the temporary deposition of waste prior to transport to the end point of disposal.



Total Recycle, in Birdsboro, Pennsylvania (Photo Credit: Recycling Product News)

HANDLING TECHNOLOGIES

CLASS THREE PROCESSING (MIXED WASTE)

Class Three Processing, also known as mixed waste processing (MWP) or materials recovery facility (MRF), involves sorting out viable recyclables from an incoming waste stream. In low tech operations, incoming waste may be dumped and picked through by workers searching the material. This scenario results in low maintenance and initial capital investment. Relying on manual labor is risky and could create low recyclable recovery rates and may create safety concerns from human errors and contaminated waste.

High Tech Class Three Processing facilities involve conveyor belt systems which feeds the waste stream through various mechanical and electronic sorters that utilize variations in density, magnetism, electric currents and lasers to separate plastic, glass, ferrous material, paper products and aluminum. These setups require the greatest capital investments, but are capable of high recyclable recovery rates.



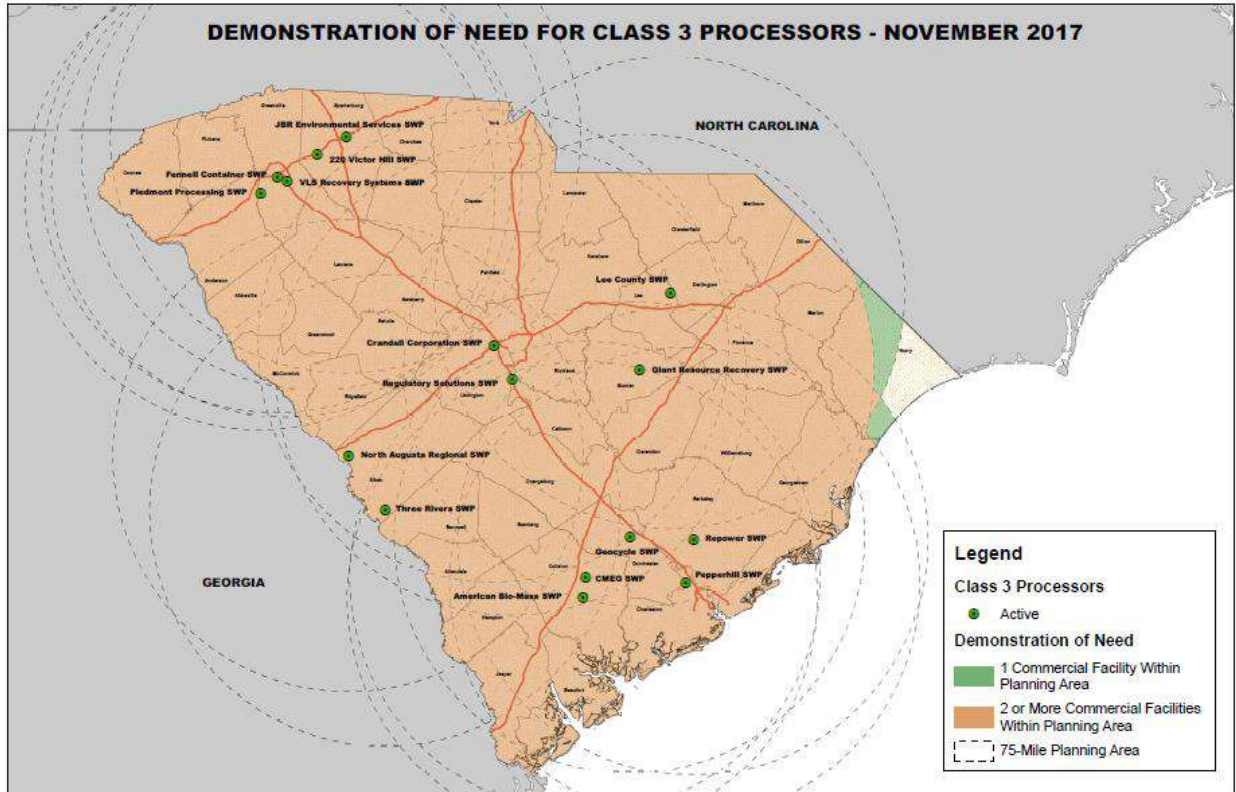
Monterey Regional Waste Management District (Photo Credit: Monterey Herald)

Combination facilities combine low and high tech operations. Conveyor belts push incoming waste past workers trained to pick out recyclables and place them in specific bins. As with all heightened-technology scenarios, larger initial capital investment costs arise from constructing the conveyor belt systems.

Recyclable recovery rates vary by load. A wet load, for instance, may increase the contamination of the waste stream and result in low recovery rates. Dry loads typically have less contamination. Under current markets, any recyclable that has been contaminated by other waste and has not been washed or cleaned are rejected and sent to a landfill.

These systems have generally **been viewed as an “easier” way for the public to recycle**, but it results in loads of recyclables being rejected. Class Three Processing facilities that separate household waste typically result in 40-50 percent recovery rate. SC DHEC typically permits these facilities near class three landfills due to the high amount of waste that has to be disposed.

Clean material recovery facilities (MRFs) that separate waste from single or dual streams also have issues with contamination. Horry and York counties stated that their waste audits show a contamination rate of about 15-20 percent. Contamination causes downtime, extra maintenance, and results in lower commodity prices and higher operational costs.



SC DHEC established the Demonstration of Need (DON) criteria for the geographic placement and allowable annual disposal rate of new or expanding solid waste facilities. The DON regulation addresses commercial solid waste processing facilities that process waste destined for disposal at Class three landfills. The regulation stipulates that where there are at least two commercial solid waste management facilities of the same type in a 75-mile radius, no new facility is allowed. SC DHEC may waive the DON requirements for owners of class three landfills.

CLASS THREE PROCESSING

PROS

- Targets Recyclable-Rich Loads
- Added to the Front End of Existing MSW Processes
- Focus on Wet or Dry Loads
- Technology and Workforce Control Commodity Recovery

CONS

- Capital and Operational Costs Dependent on Technology Utilized
- Large Portion of Waste to Landfill
- Recyclable Quality Lessened by Contamination

Site Considerations: South Carolina Department of Health and Environmental Control (DHEC) typically permits these facilities near class three landfills due to high amount of waste that has to be disposed.

GLASS CRUSHING

Glass crushing typically results from multi-stream recycling where the consumer sorts glass from MSW and other recyclables prior to disposal. Multi-stream recycling is simpler on the processing end. This type of collection requires a high level of consumer education.

Recyclables collected in Horry County – including plastic, glass, aluminum, metal cans, cardboard and paper – are processed, sorted, and baled for resale at the Material Recycling Facility (MRF). The Horry County Solid Waste Authority invested in glass crushing equipment to create a crushed glass product suitable for landscape and roadbed applications. Glass aggregate, made from ground glass bottles and jars, can be used in art projects, yard projects, driveways, flower beds, fish ponds and other landscaping project.

In April 2019, Fairfax County, the city of Alexandria, Prince William County and Arlington County announced a new partnership to recover and recycle glass. These jurisdictions committed to collecting glass via purple glass-only- drop-off containers and **bringing it to Fairfax County's "Big Blue" processing plant**. The public is encouraged to rinse food residue from the glass before depositing it in the drop-off containers.

Horry County budgeted \$300,000 for a new glass crusher in Fiscal Year 2018. Bids came in higher than the budgeted amount and an additional \$25,000 was requested from the Solid Waste Authority Board. The glass crusher will be utilized for approximately five years, before it will need to be replaced. Horry County SWA spends approximately \$60,000 per year to produce crushed glass. According to South Carolina Solid Waste Management, Horry County recycled 2,989 tons of mixed glass in 2018. Aggregate glass is sold for \$5 per ton.

In Oconee County, 43,852 tons of MSW was managed in FY 18/19. Approximately 4.5% of MSW is comprised of glass, according to the EPA. Therefore, approximately 1,973 tons of glass were managed by Oconee County in FY 18/19. This does not include recyclables. According to the report by the Oconee County Solid Waste Department, 4,279 tons of recyclables were handled in FY 18/19. Of the recyclables reported, 439 tons were comprised of glass.



GLASS CRUSHING

PROS

- Glass Aggregate for Landscape and Roadbed Applications
- Reduction in Glass to Landfill
- Various Options and Capacities

CONS

- Pre-Processing or Sorting Required
- Cleaning Required
- Five Year Replacement Plan / Continuing Costs

Site Considerations: The requirements for a relatively small amount of land increases applicability for various settings. Glass crusher plants may be located at other solid waste facilities, such as inside a materials recovery facility (MRF) or transfer station.

TRANSFER STATION

A transfer station is a building or processing site for the temporary deposition of waste. Transfer stations are often used as places where local waste collection vehicles will deposit their waste cargo prior to it being loaded into larger vehicles. These larger vehicles will transport the waste to the end point of disposal, such as at a landfill. Transfer stations load material in two ways - by loading open top trailers by pushing waste from a floor located above the trailer or using a compactor method that loads from the rear of the truck.



Due to the simplicity of transfer stations, the construction costs are the cheapest of any waste disposal facility. The capital cost for a transfer station is dependent on the proposed volume to process.

Traffic causes the most significant offsite environmental impacts associated with larger

waste transfer stations. Dependable access and smooth traffic flow are essential for the operating efficiency of the facility. Transfer stations can be a significant source of noise, which might be a nuisance to neighbors. MSW, food waste and certain yard waste have a potential for odor generation.

Due to the nature of a transfer station, little to no recycling takes place at the facility, but is the responsibility of the consumer and conducted prior to disposal. The site where the current Oconee County Transfer Station is located may accommodate a larger facility. The permitting and construction timeline ranges from one to three years.

TRANSFER STATION

PROS

- Lowest Capital and Operating Costs
- Fastest Means of Removing Waste
- Easy Permitting Due to Demonstration of Need

CONS

- All Waste to Landfill
- Low Recycling Rate
- Increased Traffic and Potential Noise / Odors

Site Considerations: Dependable access and smooth traffic flow are essential for good customer service and operating efficiency of the facility. Noise, odors and litter may be a nuisance to the surrounding community. Current facility may accommodate larger facility.

COST ANALYSIS

Based on a 20-year operation, using average cost to build and average cost to operate, Oconee County estimated the cost of each facility. These estimates do not include any revenues that may be received for tipping fees or the sale of recyclables, electricity, or byproducts. For this evaluation, 300 tons will be used to calculate daily tonnage and processing volume of 50,000 tons per year.



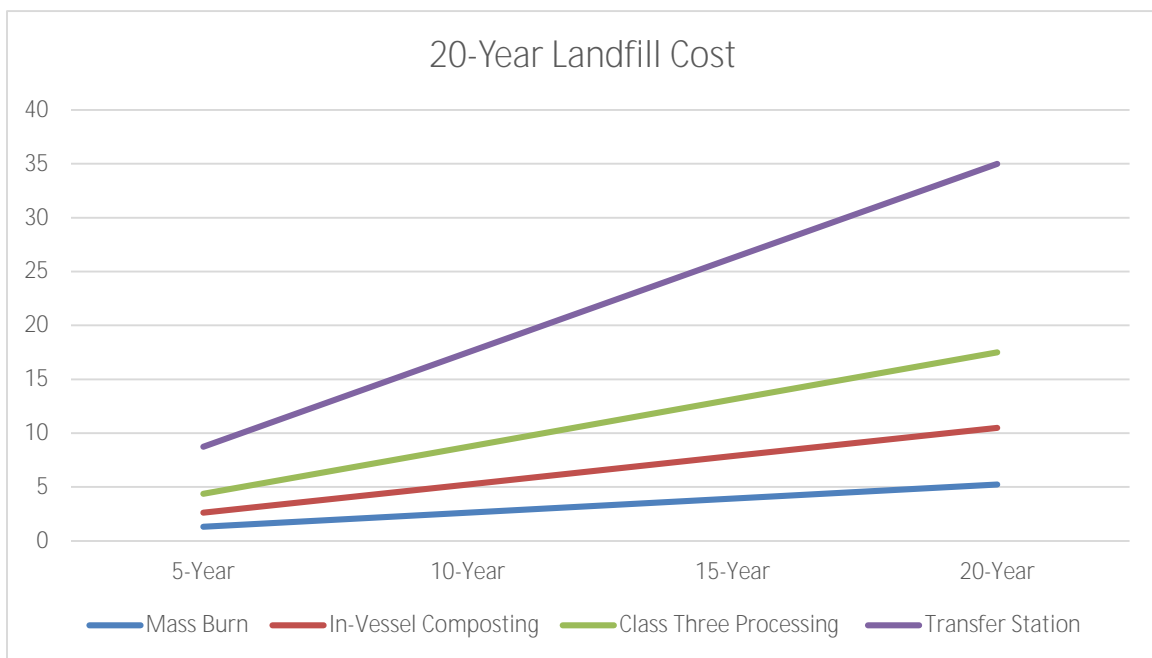
Method of Disposal	Construction Cost	Operations	20-Year Total Cost
Mass Burn	\$49.5 – 67 Million	\$2.5 – 4.5 Million	\$128.25 Million
In-Vessel Composting	\$20 – 25 Million	\$1 – 2.5 Million	\$57.5 Million
Class Three Processing	\$20 – 30 Million	\$3 – 4.5 Million	\$100 Million
Transfer Station	\$1 -2 Million	\$150 – 200 Thousand	\$5 Million

Of all incineration types, mass incineration appears to be the most viable option because it does not require pre-processing prior to incineration. Construction costs for a MSW incineration facility and/or WTE plant in the United States ranges from \$165,000 to \$225,000 per permitted ton per day. The capital construction cost to build a 300 ton per day facility would range from \$49.5 - \$67 million. The operating cost of these facilities can range from approximately \$50-\$80 per ton. The operational costs per year based on 50,000 tons per year would range from \$2.5 - \$4.5 million.

In-vessel composting systems are not as expensive as those utilized for mass incineration. The typical facility to process 300 tons per day is approximately \$20 - 25 million in capital cost. Cost may vary based on land availability, land dynamics and number of structures needed. The operational costs typically average \$25 - \$50 per ton. Yearly operational costs based upon 50,000 tons per year would range from \$1 million - \$2.5 million. The permitting and construction timeline for an in-vessel composting facility can range from two to four years.

An estimated five to ten Class Three Processing facilities are built each year in the United States, with a typical fully equipped facility averaging from \$20 million to \$30 million. The typical **Class Three Processing facility's operational costs ranges \$70 - \$80 per ton processed**. The annual operating cost estimate for a facility that processes 50,000 tons per year would range from \$3 million - \$4.5 million. The permitting and construction timeline ranges from two to five years.

A transfer station to load open top trucks and have a permit limit of 300 tons per day would cost approximately \$1 million – \$2 million. Transfer stations have lower operational costs than other solid waste handling facilities. The average cost per ton in the United States to move the waste from the collection vehicle onto the transfer vehicle is \$10 before the hauling vehicle leaves the **transfer station. Currently, Oconee County Solid Waste's transfer station's operational costs are about \$900 – \$1,200 per 300 tons processed**. This does not include any disposal or recycling costs. Using the current cost, the operational cost to process 50,000 tons per year would be \$150,000 - \$200,000.



Landfill costs are estimated by using the expected percentage of waste to still go to a landfill. Based on the approximate percent of waste going to a landfill for each method of disposal, and the cost using the current tipping fee of approximately \$35 per ton, the estimated cost of tipping fees per 50,000 tons are as follows:

Method of Disposal	Percent to Landfill	Cost Per Year	20 Year Landfill Cost
Mass Burn	15%	\$262,500	\$5.25 Million
In-Vessel Composting	30%	\$525,000	\$10.5 Million
Class Three Processing	50%	\$875,000	\$17.5 Million
Transfer Station	100%	\$1,750,000	\$35 Million

CONCLUSION

Incineration, conversion and handling technologies could be an effective way to dispose of **Oconee County's solid waste for many years to come**. The initial investment and continued operating costs, permitting, byproduct disposal and environmental impacts vary from method to method and may impact the location for the facility.

A combination of technologies may be utilized for a comprehensive solid waste management plan. For example, RePower South, an energy company, recently opened a facility in Moncks Corner, SC at the Berkeley County Class Three Landfill. The facility sorts recyclables and makes a kiln fuel from various materials for resale. Nearly 50 percent of the MSW processed through the facility is kept out of landfills.

All of the facilities produce a byproduct or have residual waste that will need to be transferred to a landfill. The percentage of the waste may vary, but the facility will require an on-site transfer station to load materials onto large vehicles.

Site considerations for all disposal methods should take into account noise, traffic and odor. Air emissions at solid waste facilities result from dust, exhaust (particularly diesel) from mobile equipment such as trucks and loaders. In the normal course of facility operations, straying waste becomes litter in and around the facility. This scenario attracts vector, such as rodents, insects or buzzards, that have the potential to transmit disease.

During the site selection process, steps should be taken to ensure that decisions are not imposing a disproportionate burden on the surrounding communities. Continuous public participation, establishing credibility and trust is as important as addressing environmental, social and economic concerns about the facility.



- Incineration, conversion and handling technologies could be effective methods to reduce waste for years to come.
- Initial investment, continued operating costs, permitting, byproduct disposal and environmental impacts may impact the type and location of the facility.
- Oconee County must determine the best course of action based on budget, feasibility, sustainability, and financial impact.
- Site considerations for all waste disposal methods should take into account noise, traffic and odor. Other considerations include traffic routes and accessibility for largest MSW consumers.



MSW Mass Incineration	
Permitting/Construction Timeline: 5-10 years	
Site Considerations: Needs at least 50 acres of area due to size of equipment and required setbacks	
Advantages	Disadvantages
Proven technology.	Significant public opposition.
Financially proven vendors and equipment providers.	Significant capital and operational costs.
Extensive control systems for air emissions and ash disposal.	Air emissions standards make this system costly.
Regulators are familiar with the technology.	MSW incinerators have been on a decline for the past 15 years.

Pyrolysis	
Permitting/Construction Timeline: Unavailable	
Site Considerations: Litter, noise, odor, traffic and dust will vary according to the facility technology, size and feedstock	
Advantages	Disadvantages
Yields solid chars, tars, oils and gas.	Typically only processes plastics.
Materials do not combust.	Pre-Processing required to remove other MSW materials.
Chemical compounds thermally decompose.	Drying process required to remove moisture.
Contained in a kiln.	Difficult permitting process.

Gasification	
Permitting/Construction Timeline: Unavailable	
Site Considerations: Litter, noise, odor, traffic and dust will vary according to the facility technology, size and feedstock.	
Advantages	Disadvantages
Yields tars, nitrogen-rich low-heat fuels and syngas.	Pre-processing required to remove other MSW materials.
Minimal land requirements.	High costs.
Little public opposition.	No commercial facilities operating in the United States.
Efficient energy production.	Possibility for hazardous residues.

In-Vessel Composting	
Permitting/Construction Timeline: 2 - 4 years	
Site Considerations: Needs at least 25 acres for finished product and several large buildings to house compost as it cures.	
Advantages	Disadvantages
Proven technology.	Odor can be an issue.
Relatively low energy consumption compared to other methods.	Only processing organic feedstock.
Viable product.	Requires pre-processing to remove recyclables and organics.
Up to 60% reduction to landfill.	Requires landfill for non-organic waste stream.

Class Three Processing of MSW	
Permitting/Construction Timeline: 2 - 5 years	
Site Considerations: DHEC typically permits near class three landfill due to high amount of waste to be disposed.	
Advantages	Disadvantages
Targets recyclable-rich loads.	Capital and operational cost dependent on technology utilized.
May be added to front-end of existing MSW processes.	Large portion of waste disposed of in landfill.
Able to focus on wet or dry loads.	Recyclable quality lessened by contamination.
Technology and workforce control commodity recovery.	Large facility needed to accommodate operations indoors.

Glass Crushing	
Permitting/Construction Timeline: Not Applicable	
Site Considerations: The requirements for a relatively small amount of land increases applicability for various settings.	
Advantages	Disadvantages
Glass aggregate and sand for resale.	Pre-processing or sorting required.
Reduction in glass to landfills.	Cleaning of glass required.
Various options and capacities.	5-year replacement / continuing costs.

Transfer Station	
Permitting/Construction Timeline: 1 - 3 years	
Site Considerations: Smooth traffic flow is essential for operating efficiency.Noise, litter and odors may be a nuisance.	
Advantages	Disadvantages
Lowest capital and operating costs.	All waste disposed of in landfills.
Fastest means of removing waste.	Little to no recycling at the facility.
Easy permitting due to Demonstration of Need	Increased traffic and potential noise / odors.

Andela Glass Recycling Equipment Exceeds Expectations!

Andela Products Provides Global Glass Recycling Solutions

Glass can be recycled over and over, each time retaining its unique properties. Therefore, glass recycling is extremely beneficial to the environment. It's no wonder that more industries are looking for ways to make glass recycling part of their initiatives to reduce their carbon footprint. Recognizing the need for reliable glass recycling equipment and systems suitable for many applications, Andela Products has emerged as one of today's global leaders in glass recycling equipment. Our extensive line of glass recycling equipment offers a turnkey solution for many industries. Whether your operation needs specialized equipment capable of turning mixed broken glass into cullet (domestic glass), or you need to break down automotive glass windshields into recyclable products, we've got you covered. Please explore our many glass recycling equipment options listed below. We can help customize a successful glass recycling program for you, using the Andela Glass Pulverizer and our other durable equipment!



GLASS PULVERIZERS

The Andela Glass Pulverizer is designed to reduce all kinds of glass into an aggregate the consistency of sand and fine gravel. It's a flexible impact system that pulverizes the glass but passes other non-frangible materials (plastic, metal, etc.) through the pulverizer in their large form, ejecting them separately from the pulverized glass stream. Our glass pulverizers can be designed to meet and exceed your exact needs.



GLASS CRUSHERS/BREAKERS

Andela Glass Crushers are designed to condense glass into cullet. We offer stand-alone glass crushers, as well as glass crushers that have been integrated into a system consisting of a surge hopper, crusher, trommel, and conveyors. When your operation needs reliable glass recycling equipment, our glass crushers are well-suited for glass mixed with other non-glass materials.



CONVEYORS

Andela's Transfer Conveyors were created to handle highly-abrasive glass products. Featuring self-cleaning tail pulleys with remote access, our conveyors are built to order using industry-standard belt widths that have been fitted for each specification. Covers with port access for dust collection and segmented belly pans with abrasion-resistant material for minimal spillage are available upon request.



SURGE HOPPERS

The Andela Metering Surge Hopper comes in many sizes to suit your needs, although many of our customers find that our Model AMSH-86 seems to fit their system well. The AMSH-86 is a 4-cubic yard surge hopper equipped with optional flared sides to accommodate larger loader buckets.

GLASS CRUSHERS

Williams Patent Crusher offers three unique glass crushing machines that can handle various jobs. These durable and safe glass crushers are the perfect solution for glass recycling and size reduction applications, whether it's for a smaller bottle-crushing projects, or for a large, industrial applications.

Discover how you could be crushing glass in way that is cost efficient and with the peace of mind of knowing your machine is backed by 150 years of experience. Learn more below or contact a sales rep for more information.

Reversible Impactors

Williams **Reversible Impactors** are among the most advanced of the secondary or tertiary crushers to achieve a high reduction ratio. Reversible Impactors, with their large unrestricted discharge opening, can be used as a glass crushers for large, industrial jobs.



Roll Crushers

William's Single and Double **Roll Crushers** are simple in design and construction, long-lasting, economical, and versatile. Roll Crushers are more suitable for smaller industrial applications and are also available in a 15-inch (381 mm) diameter dust-tight version for glass crushing applications where it would be expensive to have dust collection air.





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- GLASS CRUSHERS

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COMMERCIAL GLASS CRUSHERS

Through our line of Glass Crushers, we provide solutions to most industries including bars, restaurants, laboratories, recycling centers, hotels, casinos and many more.

REM GLASS BREAKERS – GB SERIES



The GB Series Glass Breakers are complete crushing systems. Rugged, unitized construction produces a machine that will withstand years of punishing use in recycling operations. The GB series requires minimal maintenance and has a reputation in the recycling industry as a crusher built to last.

DETAILS

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REM GLASS BREAKERS – MODEL GB/BC



Process "line-rejects" or "out-dated product" and recover recyclable glass with the GB/BC Full Beverage Glass Breaker.



To operate, simply load the glass containers into the Glass Breaker hopper.

[DETAILS](#)

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REM GLASS BREAKERS – MODEL GBS COMPACT



The GBS is the ideal hand-fed glass breaker for small recycling and business applications. Built tough for years of economical operation using the same time-proven design of the large Glass Breakers units. The GBS series requires minimal maintenance with a reputation in the recycling industry as a "glass crusher built to last."

[DETAILS](#)

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GLASS CRUSHER – THE GLASSHOPPER™



"The Under the Counter Glass Bottle Recycling Solution – Bars, Restaurants, Cruise Ships, Clubs, Hotels and Casinos"

The GlassHopper™ was designed specifically for bars, restaurants, clubs, cruise ships and hotels. This empty glass bottle crusher is capable of crushing bottles up to 750ml into recycleable cullet and reducing waste volume by up to 80%. This bottle crusher is a compact, under the counter unit. Standard equipment includes an all stainless steel cabinet, top mounted bottle entry port with two sets of double baffles, sound deadening system and easy access cullet collection container.

[DETAILS](#)

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GLASS CRUSHER – MODEL 95-2,4,6



Shown with
optional stand

"The Perfect Solution for Low Volume Glass Bottle Recycling – Bars, Restaurants and Laboratories"

Save time, money, labor and space with this new improved crusher. Machine is ideal for bars, restaurants, laboratories, cafeterias, municipalities and institutions. Users like the big savings and convenience in removal and handling costs. It is made for hard use, trouble free operation and dependability for years in service. Reduces volume by up to 80%.

[DETAILS](#)

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CAN CRUSHER AND GLASS CRUSHER – MODEL 150



"The Higher Volume Can and Glass Crushing Solution – Beverage Distributors, Recycling Operations, Restaurants, Hotels and Universities"

This multi-purpose, higher volume crusher is useful most anywhere glass containers and beverage cans are a disposal, storage or conversion concern. It is user friendly, easy to maintain and is highly portable with optional castors available. Built for trouble free and hard use with volume reductions of up to 80%.

[DETAILS](#)

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CAN CRUSHER AND GLASS CRUSHER – MODEL 160



"The Conveyor-Fed, High Volume Can and Glass Crusher Solution – Beverage Distributors, Recycling Operations, Municipalities and Breweries"

This conveyor-fed crusher is designed for recovery/recycling use or any operation where glass bottles and aluminum/steel cans are a disposal, storage or conversion problem. Ideal for bottlers, breweries, communities or other public/private size reduction facilities. Fast, efficient operation crushes either bottles or cans without change in machine setup. Built for hard use and trouble free operation with minimal maintenance or up-keep.

[DETAILS](#)

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CAN CRUSHER AND GLASS CRUSHER – MODEL 170 – MAGNETIC HEAD



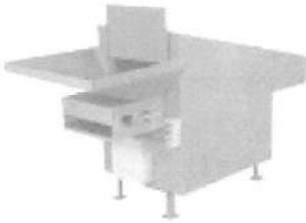
"The Conveyor-Fed, High Volume Can and Glass Crusher – Separates Steel from Aluminum Cans – Beverage Distributors, Recycling Operations, Municipalities and Breweries"

This conveyor-fed crusher is designed for recovery/recycling use or any operation where glass bottles and aluminum/steel cans are a disposal, storage or conversion problem. The Model 170 utilizes a magnetic head pulley which allows you to separate steel from aluminum cans. A unique hinged steel door under the magnetic head allows you to first crush aluminum cans and sort steel (when open), then crush your steel cans (when closed).

[DETAILS](#)

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CAN CRUSHER AND GLASS CRUSHER – MODEL 250



"High Volume Can and Glass Crusher Ideal for Can Manufacturers, Recycling Centers, Bottlers and Breweries"

This crusher is user friendly, easy to maintain and requires no change in machine setup to crush cans or glass. Built for hard use and trouble free operation with minimal maintenance or upkeep. Overload compression springs prevent jamming. 5 HP.

[DETAILS](#)

[FREE QUOTE](#)

CAN CRUSHER AND GLASS CRUSHER – MODEL 270



"High Volume Can and Glass Crusher Ideal for Can Manufacturers, Recycling Centers, Bottlers and Breweries"

A larger and more powerful version than the Model 250 with greater throughput.

This crusher is user friendly, easy to maintain and requires no change in machine setup to crush cans or glass. Built for hard use and trouble free operation with minimal maintenance or upkeep. Overload compression springs prevent jamming. 10 HP.

[DETAILS](#)

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GLASS CRUSHER – MODEL 318



"The Medium to High Volume Glass Crushing Solution – Beverage Distributors, Recycling Operations, Cruise Ships, Restaurants, Hotels & Universities"

Designed for stand alone use or in conjunction with a conveyor and can be mounted below chutes in MRF applications. A small, compact unit that will hold up to most anything you can throw at it. Volume reductions up to 80%.

[DETAILS](#)

[FREE QUOTE](#)

GLASS CRUSHER – MODEL 620



"The High Volume, Conveyor Fed Glass Crushing Solution – Bottling Operations, Beverage Distributors, Recycling Operations and Municipalities"

A high volume glass crusher designed for long life and trouble free operation. This model is capable of handling full or empty bottles. Conveyor Fed design with side flanges on belt and cover rails to contain material. This feature has

been proven to greatly extend the life of the belt, eliminating some costly routine maintenance found on other crushers. Volume reductions up to 80%.

[DETAILS](#)

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SEARCH BY MATERIAL

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TESTIMONIALS

"We are very happy with our compactor on our riverboat the Creole Queen. We've had this machine on board for the past few years and **it's the most reliable piece of equipment I've ever seen**. We use it every day, it still looks brand new and it has had a revolutionary impact on our operation. You offer a wonderful product."

Captain Brian Collins
New Orleans Paddlewheels

"I never hesitate to recommend our Vertical Trash Compactor because it does everything your brochure represents it to accomplish. **I can't imagine anyone in the restaurant business not utilizing this apparatus**. It really has become one of my proudest restaurant possessions. It works so smooth that I almost feel smug when I see all the gigantic trash containers for other restaurants."

Robert Leonardi
Leonardi's Restaurant, Fort Lauderdale, Florida



(<https://andelaproducts.com/>)

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Glass Markets

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What markets exist for Andela Glass?

The first question asked by most people interested in pulverizing recycled glass is; what will I do with it? The second question is; whom can I sell it to? The third and easily the most important question is; who will pay the most money for the recycled glass product I produce? The answers to these questions will depend on your local market. Local markets are virtually unlimited and save on the cost of transportation. The key is to collect, process, and sell locally.

Pulverized Glass Markets

- **Filtration:** Choker Grit, Drain Pipe Bedding, Backfill, Drainage Aggregate, Septic Fields, Underdrains, French Drains, Golf Course Green Drainage
- **Aggregate:** Backfill/Clean Fill, Embankments, Clean Fill Sand, Hydroponics, Landfill Cover, Oil Spill Cleanup, Road Sand, Solar Heat Storage, Termite Barrier, Utility Bedding and Backfill, Weighted Bags-Construction

- **Glassphalt – Paving Application:** Aggregate Base Course, Asphalt Base Course-Glassphalt, Asphalt Surface Course-Glassphalt, Parking Lots and Driveways

With further processing the patented clean glass process there are a number of other value added markets. For more information refer to www.sioneer.com
(<http://www.sioneer.com>)

CleanGlass Product Markets

- **Abrasives (Sand Blasting, Sandpaper):** Sand Blasting with glass is beneficial because it has no health complications compared to silica sand.
- **Landscaping (Sand Blasting, Sandpaper):** Glass not only adds sparkle and brilliance to your garden but will not lose color overtime and acts as a great non-invasive weed control.
- **Glass Products:** Art Glass, Decorative Marbles, Ecoglass, Fiberglass Manufacturing, Flat Glass, Foamglass, Glass Beads, Bottle Manufacturing, Hand Rolled Flat Glass, Industrial Marbles, Jewelry, Opacified Flat Glass, Pressed Glass, Sintered Mosaic Tile, Waste Vitrification
- **Other Glass Composite Products:** Aqueduct Liner, Brick/Steel Fluxing Agent, Composite (Plastic-Glass) Wall Panels Flue Gas, Sorbent, Glass-Mica Composite, Glass-Polymer-Composite(GPC) Sewer Pipe, Glass/Sludge Tile, Glasscrete Architectural Surfacing, Industrial Flooring, Plastics Filler, Rockwool Manufacturing, Roof Tiles, Terrazzo, Vibratory-Cast Wall Panels
- **Fiberglass Feedstock**

Supporting Articles

- [Friendly Glass and Markets for Andela Glass \(https://andelaproducts.com/wp-content/uploads/2017/06/friendly-glass-and-markets-for-andela-glass1.pdf\)](https://andelaproducts.com/wp-content/uploads/2017/06/friendly-glass-and-markets-for-andela-glass1.pdf)



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information and to inquire about
making application for a court
appointed attorney, if you so desire.
You have the right to be represented
by a lawyer in this case. If you want a
lawyer and cannot afford one, the
Court will appoint a lawyer for you.

This the 26th day of September,
2019.

Mary G. Holliday
Attorney for Petitioner
Jackson County Department
of Social Services
PO Box 597
Webster, North Carolina 28788
(828) 631-0346

**NOTICE TO CITIZENS OF OCONEE
COUNTY:** Pursuant to the South
Carolina Eminent Domain Procedure
Act, Section 28-2-70(c), Code of
Laws of South Carolina, 1976, as
amended, notice is hereby given that
entry by personnel of the South
Carolina Department of Transporta-
tion will be made in the area of the
roads described below for such
purposes as topographic surveys,
subsurface exploration, environmen-
tal related studies and for the
gathering of any other data necessa-
ry for the planning, development of
location alternatives, design, property
acquisition and construction of high-
way improvement projects.

The proposed project includes the
replacement of the existing bridge
over Mud Creek within the county
limits of Oconee. A detour may be
utilized for this bridge replacement to
facilitate a shorter construction peri-
od as well as reduce costs.

It is anticipated that traffic will be
detoured throughout construction ac-
tivities due to the volume of traffic on
S-99 (Rodgers Rd). The purpose of
this project is to upgrade the current
facilities with a new bridge structure
that conforms to current standards
that will also improve safety. Addi-
tional rights of way may be needed to
construct this project. More specific
information may be obtained by
contacting Warren Hart with SCDOT
at telephone number (803)737-2049
in Columbia or by email at hartwd@
scdot.org.

The Oconee County Council will hold
a special meeting at 5pm, Tuesday,
November 19, 2019 in Council
Chambers at the Oconee Administra-
tive Offices located at 415 South
Pine Street, Waihalla, SC 29691 to
discuss alternative waste processing
methods.

The Oconee County Real Estate,
Facilities, & Land Management Com-
mittee AND the Planning & Economic
Development Committee has moved
the time of the meetings on Tuesday,
November 19, 2019 from 4:30 p.m.
to 4pm. These meetings will take
place in Council Chambers at the
Oconee Administrative Offices loca-
ted at 415 South Pine Street,
Waihalla, SC 29691.

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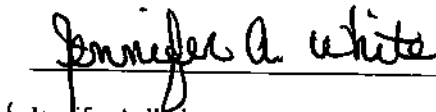
IN RE: Oconee County Council Meeting November 19

BEFORE ME the undersigned, a Notary Public for the State and County above named, This day personally came before me, Hal Welch, who being first duly sworn according to law, says that he is the General Manager of **THE JOURNAL**, a newspaper published Tuesday through Saturday in Seneca, SC and distributed in **Oconee County, Pickens County** and the Pendleton area of **Anderson County** and the notice (of which the annexed is a true copy) was inserted in said papers on 10/03/2019 and the rate charged therefore is not in excess of the regular rates charged private individuals for similar insertions.



Hal Welch
General Manager

Subscribed and sworn to before me this
10/03/2019



Jennifer A. White
Notary Public
State of South Carolina
My Commission Expires July 1, 2024

